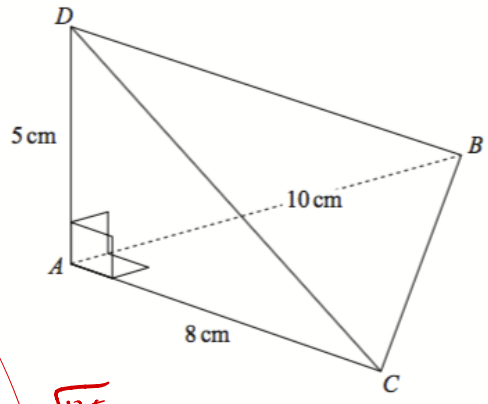
Shape and Space V (4) Area of non right angled triangles

Do now:

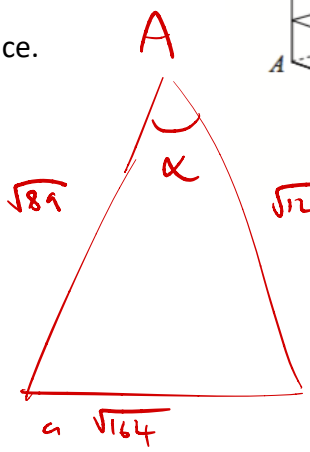
The diagram shows a tetrahedron.
AD is perpendicular to both AB and AC.
Angle BAC = 90°.
Calculate the size of angle BDC.
Give your answer correct to 1 decimal place.



$DC = \sqrt{5^2 + 8^2} = \sqrt{89}$

$DB = \sqrt{10^2 + 5^2} = \sqrt{125}$

$BC = \sqrt{8^2 + 10^2} = \sqrt{164}$

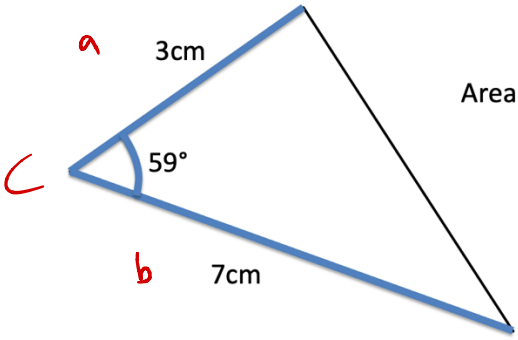


$A = \cos^{-1}\left[\frac{b^2 + c^2 - a^2}{2bc}\right]$

$A = 76.3°$

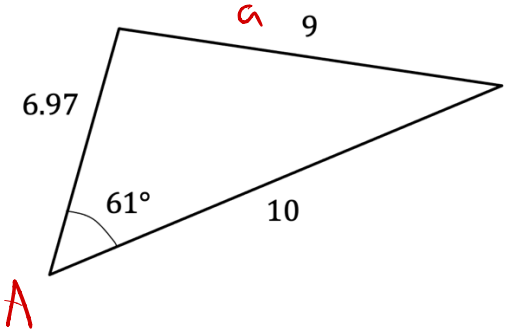
$$\text{Area} = \frac{1}{2} a\, b \sin(C)$$

Where C is the angle wedged between two sides a and b.



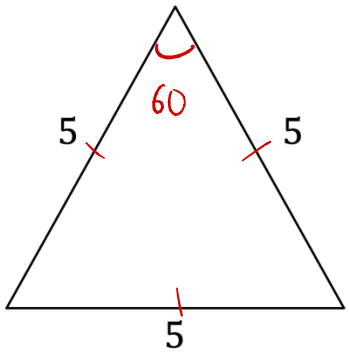
Area = $\frac{1}{2}(3)(7)\sin 59 = 9.00\text{cm}^2$

EQUILATERAL



AREA = $\frac{1}{2}(6.97)(10)\sin 61$

$= 30.48$



AREA = $\frac{1}{2}(5^2)\sin 60$

$= \frac{25\sqrt{2}}{4}$

Harder examples

ABCD is a parallelogram.

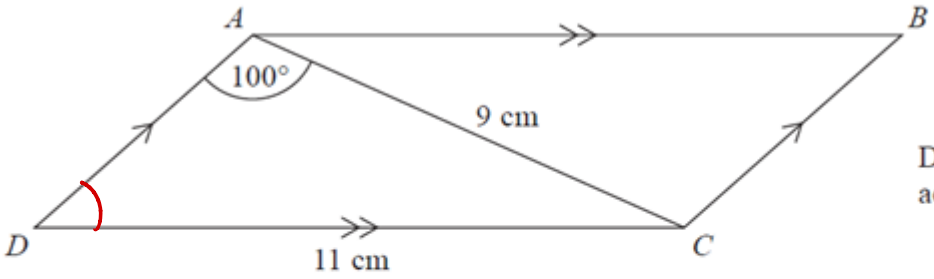


Diagram **NOT** accurately drawn

$AC = 9$ cm
$DC = 11$ cm
Angle $DAC = 100°$

Calculate the area of the parallelogram.
Give your answer correct to 3 significant figures.

CALCULATE $\angle ADC$

$\frac{\sin D}{9} = \frac{\sin 100}{11}$

$D = 53.6829°$

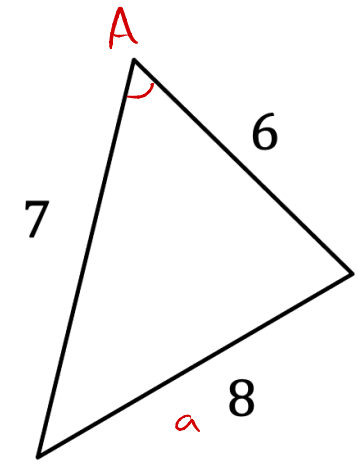
$\therefore \angle ACD = 180 - 100 - 53.6829 = 21.945°$

$\text{AREA}_{ADC} = \frac{1}{2}(9)(11)\sin(21.945)$

$= 21.945$

$\text{AREA}_{ABCD} = 2 \times 21.945 = 43.9$ (3sf)

Q2



$A = \cos^{-1}\left[\frac{7^2 + 6^2 - 8^2}{2(7)(6)}\right]$

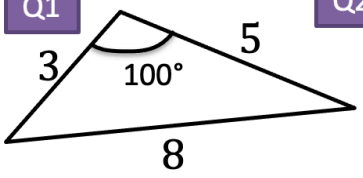
$A = 75.5°$

$\text{AREA} = \frac{1}{2}(7)(6)\sin(75.5)$

$= 20.3$

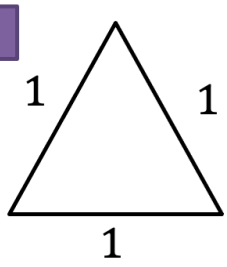
Calculate the areas of the traingles

Q1



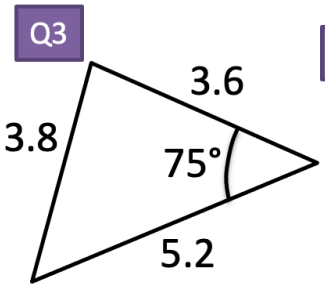
$A = 7.39$

Q2



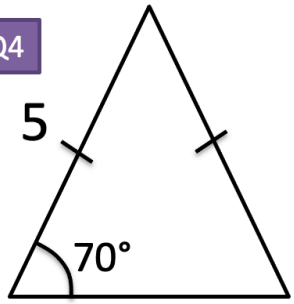
$A = \frac{\sqrt{3}}{4} = 0.433$

Q3



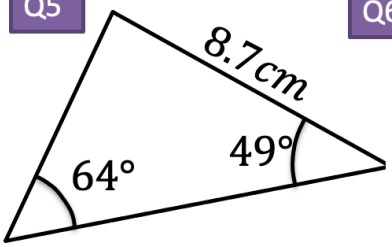
$A = 9.04$

Q4



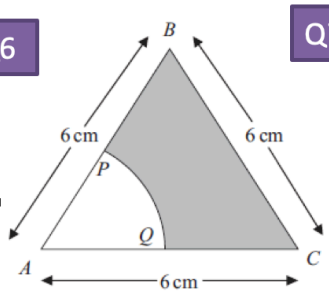
$A = 8.03$

Q5



$A = 29.25\text{cm}^2$

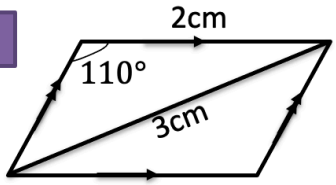
Q6



P is the midpoint of AB and Q the midpoint of AC. APQ is a sector of a circle. Find the shaded area.

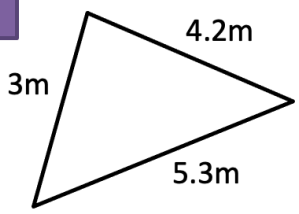
$A = 10.9\text{cm}^2$

Q7

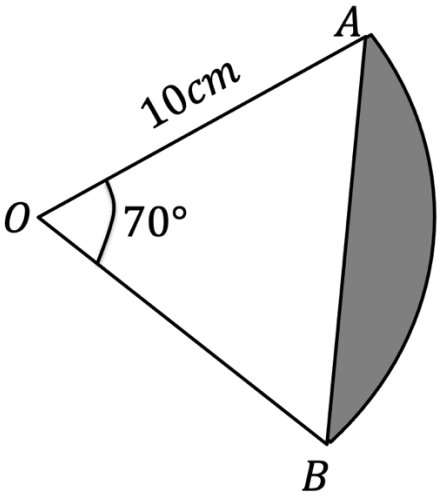


$A = 3.11\text{cm}^2$

Q8



$A = 6.29\text{m}^2$



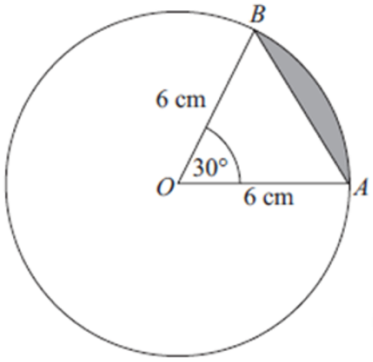
OAB is a sector of a circle, centred at *O*.
Determine the area of the shaded segment.

Area of sector = $\frac{70}{360}\pi(10^2) = 61.0865\text{cm}^2$

Area of triangle = $\frac{1}{2}(10)^2\sin 70 = 46.9846\text{cm}^2$

Area of segment = $61.0865 - 46.9846$

= 14.1 (3sf.)



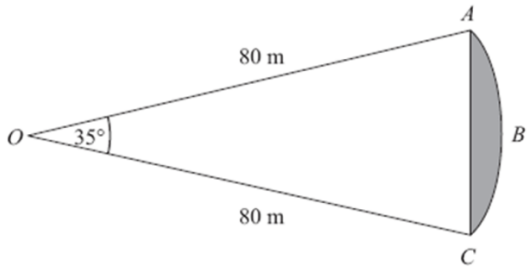
The diagram shows a circle, centre *O*.
A and *B* are points on the circle.
OA = *OB* = 6 cm.

The value of sin 30° = $\frac{1}{2}$

Work out the area of the shaded segment.
Give your answer in terms of π.

$A = \frac{30}{360}\pi(6^2) - \frac{1}{2}(6^2)\sin 30$

$A = 3\pi - 9$



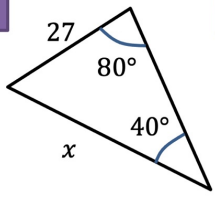
ABC is an arc of a circle centre *O* with radius 80 m.
AC is a chord of the circle.
Angle *AOC* = 35°.

Calculate the area of the shaded region.
Give your answer correct to 3 significant figures.

$A = \frac{35}{360}\pi(80^2) - \frac{1}{2}(80^2)\sin 35$

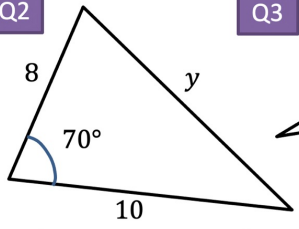
$A = 119\text{m}^2$

Q1



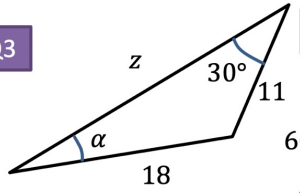
a) $x = 41.37$
b) $Area = 483.63$

Q2



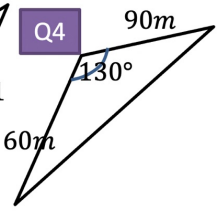
$y = 10.45$
$Area = 37.59$

Q3



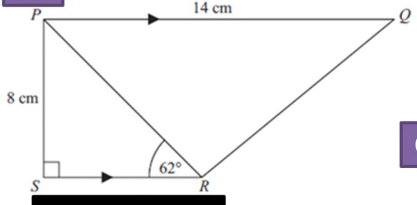
$\alpha = 17.79°$
$z = 26.67$
$Area = 73.33$

Q4



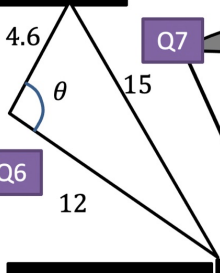
$Perimeter = 286.5m$

Q5



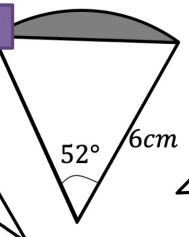
$QR = 12.6cm$

Q6



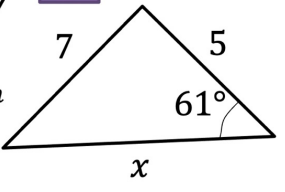
$\theta = 122.8°$

Q7



$Area = 2.15cm^2$

Q8



$x = 7.89$
$Area = 17.25$